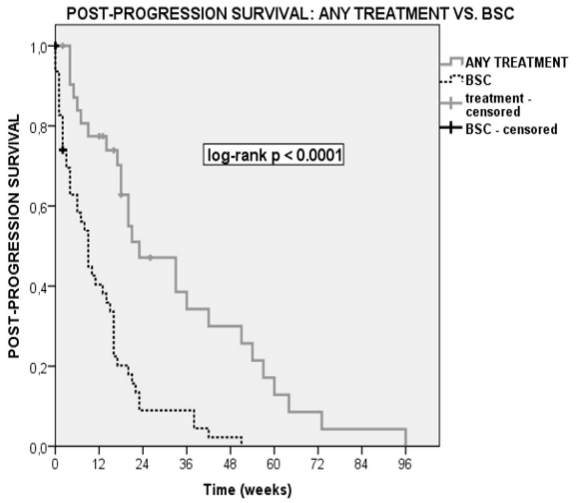
any treatment was 23 weeks vs. 9 weeks in pts with BSC, p<0.0001. In pts who received local treatment (8: surgery + 3: RT) median PPS was 51 vs. 21 weeks for CHT, p = 0.36. Median PPS for surgery was 51 weeks vs. 17 weeks for RT, p = 0.62. Pts with poor KPS (<60) at relapse did not benefit from local treatment as compared with CHT: median PPS for local treatment vs. CHT was 14 vs. 18 weeks, p = 0.81. Median PPS for poor KPS pts with BSC was 7 weeks. For the whole group of 84 pts, median OS from randomization was 35 weeks: 55 vs. 30 weeks in pts who received any treatment vs. BSC only, p < 0.0001.

Figure 1



Conclusions: Our results suggest that an active therapeutic approach may be beneficial for selected elderly and/or frail pts with rGBM, compared to BSC alone. Re-surgery seems to be the most efficacious therapeutic option for rGBM in elderly pts with high KPS; in poor KPS pts there is no benefit of local treatment (surgery and/or RT) over CHT.

PO-0812

Long-term outcomes and toxicity after proton beam radiotherapy of large non-peripapillary choroidal melanoma

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Purpose/Objective: To report on outcomes and toxicity after proton beam radiotherapy for large non-peripapillary choroidal melanoma considered unsuitable for other eye-sparing therapies in Canada.
Materials and Methods: We included patients with non-peripapillary tumors (>2mm from the optic disc) treated with proton therapy at TRIUMF, the only ocular proton therapy facility in Canada, from 1995-2013. A prospective database including patient, tumor, and treatment characteristics was updated with ocular complications and follow up status from chart reviews.
Results: In total, 77 patients were included in the analysis. The median age was 60 years and the median observation time 47 months (0-221 months). More than half of the patients (53%) had a tumor located anterior to the equator and 35% had involvement of the ciliary body. The median tumor diameter was 13.6 mm and the median thickness was 7.1 mm. The 5 -(10) year actuarial rate was 85 (85)% for ocular tumor control, 72 (57)% for metastasis-free survival, 77 (63)% for overall survival, 22 (22)% for enucleation and 38 (38)% for complete blindness. 80% of patients with blindness had developed neovascular glaucoma.
For patients with good vision (≥20/50) at baseline, the 5-(10) year actuarial rate was 40 (40)% for conservation of vision of 20/50 or better, 44 (44)% for conservation of vision of 20/200 or better and 67 (67)% for conservation of vision of counting fingers or better.
On univariate analysis, patients with ciliary body involvement had significant worse metastasis-free survival and overall survival rates compared to patients without ciliary body involvement (p<0.001).
Conclusions: Proton therapy resulted in acceptable local control and survival rates in patients with large anteriorly located tumors. The risk of complete blindness and severe toxicity requiring enucleation was low and a substantial proportion maintained a useful vision.

Poster: Clinical track: Early phase trials

PO-0813

Feasibility of using the 'cohort multiple Randomized Controlled Trial' design to conduct the RECTAL BOOST* study

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Purpose/Objective: * RECTAL BOOST = RandomizEd Controlled Trial for pre-operAtive dose-escaLation BOOST in locally advanced rectal cancer.
Randomized controlled trials (RCTs) are the gold standard to evaluate effectiveness of new interventions. RCTs often experience difficulties in recruitment and generalizability. We introduced the 'cohort multiple Randomized Controlled Trial' (cmRCT) to efficiently and simultaneously evaluate multiple oncologic of interventions, while maintaining the highest level of evidence.
The RECTAL BOOST* study, which compares response rates after boost plus standard chemoradiation (CRT) (intervention arm) to standard chemoradiation alone (control arm) in patients with locally advanced rectal cancer (LARC), is the first clinical study according to cmRCT design. We evaluated feasibility of this design in terms of recruitment rates and boost-offer acceptance.
Materials and Methods: The basis of this 'cohort multiple Randomized Controlled Trial' (cmRCT) is a cohort consisting of all patients with rectal cancer. Patients consent to prospective collection of clinical, histological and quality-of-

life data. In addition, they consent to broad randomization for being offered experimental interventions.
Within this cohort, patients eligible for boost treatment - LARC (T3+/4NxM0 or TxN2M0) located ≤10cm from the anus - are included in a sub-cohort. From this sub-cohort, a random sample is offered the boost treatment in addition to CRT (intervention arm); this offer may be accepted or refused. Patients who are not randomly selected to be offered the boost intervention undergo standard CRT without further study notification (control arm). Data will be analyzed according to intention-to-treat.
The boost intervention consists of 5 x 3Gy to the gross tumor volume (without concomitant chemotherapy) delivered 1 week prior to standard CRT (25 x 2Gy combined with capecitabine).
Results: In the past 6 weeks, of the 10 eligible patients, 9 consented for cohort participation and gave broad consent for randomization. All nine patients were randomized. Four patients were allocated to the control arm and received CRT without further notification. Five patients were allocated to the intervention arm and were offered the boost in addition to CRT. Three patients accepted and underwent the boost, whereas 2 refused because of personal reasons and reluctance to undergo MRI.
Conclusions: The cmRCT design shows potential to achieve high recruitment rates (9 out of 10 patients) and offer patients interventions by asking broad consent for randomization. If the number of patients refusing the offer remains high, the boost effect may be diluted, demanding advanced statistical solutions (instrumental variable analysis). Updated results will be presented in April 2015.

Poster: Physics track: Basic dosimetry and phantom detector developments/characterisation

PO-0814

A new approach to convert high energy imaging systems (EPID)signal into absorbed dose to water

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Purpose/Objective: During the past 10 years, the mathematical models proposed for converting an EPID signal into absorbed dose to water have evolved considerably by integrating correction functions of various degrees of complexity to take modern conditions of irradiation into account. As a whole, these models require prior knowledge of mechanical and dosimetric data for the radiation beams so that suitable correction factors can be applied. However, in spite of all this sophistication, the results obtained show discrepancies between the calculated and measured doses that may exceed 5% for image pixels that have received an equivalent dose lower than 30cGy in water.
In this work, we propose a new method for calibrating the EPID detector which leads to a simple, robust model of the detector response to irradiation by X-ray photons, in absorbed dose to water. This modelling applies to all pixels of the image, without any correcting factor and whatever the level of the equivalent dose in water.
Materials and Methods: Starting from the hypothesis that the grey level (GL) read in each pixel of the image is proportional to the average dose in water (D) delivered by the irradiating beam for each acquisition frame making up the final image (D=Dtot/Nbframes; Dtot: total dose delivered by the beam; Nbframes: number of acquisition frames), we established a simple relation among all these data:
$D = A + B * \ln(GL - C)$ Equation1
The coefficients A, B and C are obtained by mathematical modelling of the pairs of values of D and GL read on the central pixel of a set of images called 'calibration images'.
Results: Applied to each of the 37 'calibration images', Equation 1 showed differences of less than 2% between the calculated dose and the dose measured in water for the central pixel. When this equation was applied, with no additional mathematical correction, to all the pixels of the 2-D image, the results showed that over 95% of the points of the image respected a γ-index criterion fixed at 2%/2mm. This modelling was also applied to 2-D EPID images obtained by simulating VMAT fields and the results satisfied a γ-index criterion fixed at 3%/3mm for more than 95% of the points analysed.
Conclusions: Our method allows the EPID to be considered and used as a 2-D detector measuring the absolute absorbed dose to water.

PO-0815

Dosimetric precision of 3D gel dosimetry compared with radiochromic films in volumetric modulated arc therapy

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Purpose/Objective: The complexity of modern radiotherapy necessitates comprehensive dose validation which has motivated research into three dimensional (3D) dosimetry. One such dosimetry system is based on polymerization of monomers suspended in a gelatin matrix. To verify the performance of such a polymer gel dosimetry system we have in this study compared its dosimetric precision to that of conventional radiochromic films.
Materials and Methods: A cylindrical normoxic polyacrylamide gel (nPAG) dosimeter (Ø15cm x 15cm) and an EBT2 radiochromic film dosimeter (15x15cm^2) were irradiated with a volumetric modulated arc therapy (VMAT) plan. During irradiation the film was embedded in the gel dosimeter to obtain similar irradiation conditions. The resulting dose distribution consisted of a cylindrical shaped dose region with a gradient along the cylinder axis from 5 Gy to 0 Gy. The dose distributions were subsequently read out using an optical CT scanner and a flatbed scanner, respectively, and were then compared to the calculated distribution using a voxel-to-voxel difference analysis.
Results: Good agreement was observed between the two measurements and the calculated plan as seen in figure 1. A slight deviation of the gel measurement was observed at the lowest dose. The voxel-to-voxel difference analysis resulted